

CLAIMS

What is Claimed is:

1. A lightweight ballistic resistant rigid structural panel, comprising:
a plurality of sheets of flexible, high-tensile strength fabric interleaved with
5 a plurality of sheets of a fusible film adhesive;
a sheet of cushioning material adhered to the plurality of sheets of flexible,
high-tensile strength fabric to form a panel core;
a first fiber-reinforced face skin adhered to a surface of the panel core;

and

10 a second fiber-reinforced face skin adhered to the panel core opposite to
the first fiber-reinforced face skin, wherein the panel core is interposed between the first
fiber-reinforced face skin and the second fiber-reinforced face skin.

15 2. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein
the rigid structural panel has an area density not greater than 2.5 pounds per square
foot.

3. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein
the rigid structural panel has an area density not less than 1.8 pounds per square foot
and not greater than 2.5 pounds per square foot.

20 4. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein
the rigid structural panel has a ballistic resistance not less than level IIIA set forth in
National Institute of Justice Standard 0101.04.

5. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein
the rigid structural panel has a rigidity not less than a honeycomb-core structural panel
of equivalent thickness.

6. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein the rigid structural panel has an area density not greater than 2.5 pounds per square foot, a ballistic resistance not less than level IIIA set forth in National Institute of Justice Standard 0101.04, and a rigidity not less than a honeycomb-core structural panel of equivalent thickness.

7. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein each of the sheets of flexible, high-tensile strength fabric is selected from the group consisting of a woven fabric and a unidirectional fabric.

8. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein each of the sheets of flexible, high-tensile strength fabric is made from a fiber material selected from aramid fiber, ultra high molecular weight polyethylene fiber, and PBO fiber.

9. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein each of the sheets of flexible, high-tensile strength fabric has a tensile strength not less than 100 pounds per inch of width, for every ounce per square yard of fabric weight.

10. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein the sheets of flexible, high-tensile strength fabric number not less than 12 and not more than 33.

11. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein the panel core is not less than 0.25 inches thick, and not greater than 2 inches thick.

12. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein each of the sheets of fusible film adhesive is made of a material selected from an ionic copolymer, an epoxy, and a polyurethane material.

13. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein the sheet of cushioning material is selected from an aramid honeycomb material, an aluminum honeycomb material, and a polyurethane foam material.

5 14. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein the sheet of cushioning material has a density not less than 3 pounds per cubic foot and not greater than 8 pounds per cubic foot.

15. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein the first face skin and the second face skin are fiberglass woven roving materials impregnated with a phenolic resin.

10 16. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein each of the first face skin and the second face skin are not less than 0.02 inches thick, and not greater than 0.10 inches thick.

15 17. The lightweight ballistic resistant rigid structural panel of Claim 1, further comprising a cut-resistant layer adhered to an outer surface of at least one of the first face skin and the second face skin

18. The lightweight ballistic resistant rigid structural panel of Claim 1, wherein the cut-resistant layer is a stainless steel mesh.

20 19. The lightweight ballistic resistant rigid structural panel of Claim 1, further comprising at least one layer of gummy resin in the panel core between the first face skin and the second face skin.